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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/753,722 | 01/04/2001 | Shingo Iwasaki | 041514-5103 | 2640 |
| 9629 | 7590 | 08/10/2004 | EXAMINER | |
| MORGAN LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004 | | | BAUMEISTER, BRADLEY W | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2815 | |

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/753,722

Applicant(s)

IWASAKI ET AL.

Examiner

B. William Baumeister

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) 6,8,15-29,35,37 and 44-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7,9-14,30-34,36,38-43 and 47-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-5, 7, 9-14, 30-34, 36, 38-43 and 47-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu '924 in view of EP '533.

a. Komatsu '924 discloses electron-emitting devices. See e.g., FIGs 4A-D wherein the device comprises an electron source layer 64; an insulating layer 66 formed on the electron source layer and having at least one island region serving as an electron-emitting section in which the film thickness of said insulating layer is gradually reduced; a metal thin film electrode 72 formed on said insulating layer. A semispherical mask 62 is used to form the metal thin film electrode such that the metal thin film terminates on said insulating layer within said island region and is completely absent in a central region having been masked. Also see e.g., the embodiment of FIG 10 wherein Komatsu discloses that the electron-emitting device may be modified by further including a low work function thin film material 142 that overlies the gate electrode.¹ Komatsu does not anticipate the claims because it does not disclose that the low work function thin film may be composed of carbon or a carbon compound.

¹ FIG 10 of Komatsu includes two labeling errors. The lower thin film is not labeled and the upper thin film is labeled as being the gate electrode layer 148. Comparison with FIG 10 of the foreign priority document, JP 3-225,721, indicates that the lower thin film is actually the gate electrode 148, and the upper thin film is the low work function material thin film 142.

Art Unit: 2815

b. EP '533 teaches a display apparatus including a pair of spaced substrates with a vacuum therebetween, a plurality of electron-emitting devices provided on the first substrate; a collector electrode provided on an interior surface of the second substrate with a phosphor layer, and wherein the electron emission devices have an electron supply (source) layer 12; an insulating layer 13; and a thin film metal electrode 15. In the embodiment of FIG 26, an intermediate layer 14 having a work function which is lower than that of said thin-film metal electrode 15 is interposed between the insulating layer 13 and the metal thin film 15. See e.g., page 16, lines 20-25 wherein the reference teaches that this layer may be composed of C or ZrC. The embodiment of FIG 34 also teaches that the low work function material may alternatively be formed dispersed within the metal electrode 15.

c. It would have been obvious to one of ordinary skill in the art at the time of the invention to have employed C or a carbon compound such as ZrC for the low work function thin film 142 of Komatsu because EP '533 teaches that these particular compounds were conventionally known, functionally equivalent compositions for low work function thin films in electron emitting devices.

d. Various ones of these product claims set forth process limitations (e.g., claims 1 and 30, last limitation; and claims 4, 5, 33 and 34). According to the well-established product-by-process doctrine, the burden is on applicant to prove that a structural difference necessarily results from the processes set forth in the product claims.

e. For compact prosecution the examiner notes that even if any of the claims (such as claims 9 and 38) must be interpreted narrowly to require that the thin films terminate

Art Unit: 2815

directly on the underlying insulating layer as opposed to terminating in an overhanging disposition (compare e.g., FIG 4D of Komatsu with Applicant's FIG. 12), the claims would nonetheless read on an intermediate processing stage that exists between the stages depicted in FIGs 4C and 4D: subsequent to the removal of mask 62, but prior to the etch of the insulating layer 66.

f. Regarding claims 7, 10, 36 and 39, Komatsu more specifically discloses the low work function material being disposed over the gate electrode instead of being interposed between the gate electrode and insulating layer as claimed. Nonetheless, EP '533 teaches that the low work function may alternatively be interposed between the gate electrode and the insulating layer or alternatively be intermixed with the gate electrode material. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Komatsu by alternatively forming the low work function layer under the gate electrode as taught by EP '533 for various reasons, such as for better film adhesion or reduced metal diffusion, depending upon the specific gate electrode metal that is desired to be employed.

g. Regarding claims 11 and 40, the SiO_x insulating film is formed to a thickness of about 5,000 angstroms (col. 4, lines 40-45).

Response to Arguments

3. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 2815

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Contact Information

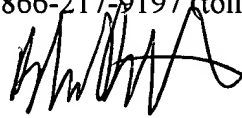
Any inquiry concerning this communication or earlier communications from the examiner should be directed to B. William Baumeister whose telephone number is (571) 272-1722. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2815

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BRADLEY BAUMEISTER
PRIMARY EXAMINER



B. William Baumeister
Primary Examiner
Art Unit 2815

August 6, 2004